

M.F.Sc. Fish Biotechnology (1st Semester)

Course: FBT-501 “Fundamentals of Molecular Biology” (2+1) Lecture Plan (Theory)

S. No.	Unit	Topics	Lecture Plan
1	Unit I Structure and properties of genome	Genetic material, Content of the Genome, Structures of DNA and RNA	02
2		Stereochemistry of bases and secondary structures; Alternative forms of DNA structure;	01
3		Organisation of bacterial, viral and eukaryotic genome;	01
4		Physico-chemical properties of DNA (T _m , Hyperchromaticity, Kinetic Classes, Buoyant Density etc.).	02
5	Unit II DNA replication	Models of DNA replication in prokaryotes, Eukaryotes and viruses	01
6		Molecular events during DNA replication;	02
7		Structure and function of DNA polymerases and types;	01
8		Importance of Telomere and Telomerase in replication of chromosome termini.	01
9	Unit III Transcription	Transcription in Prokaryotes – Bacterial RNA polymerase, Initiation, elongation and termination;	02
10		Transcription in Eukaryotes – RNA polymerases and mechanism;	02
		Post-transcriptional modifications; Structure and synthesis of rRNA and tRNA.	02
11	Unit IV Translation	Genetic code, Codon bias, Types and structures and active Centre of ribosomes, tRNA structure, Wobble hypothesis,	02
12		Mechanisms of translation and post-translational modifications in prokaryotes and eukaryotes and the factors involved in various steps	03
		Concept of polysomes and protein structure.	01
13	Unit V DNA recombination	Homologous and site-specific recombination; Crossing over; Holliday junction; Transposition	03
14	Unit VI Mutations	Types, mutagens. Molecular basis of mutation,	02
15		Mutations induced by chemicals, radiation, transposable elements;	02
16		DNA Repair: DNA repair enzymes; Types and mechanisms; Methods for detection of DNA damage.	02
Total			32

(Dr. Mamta Singh)
Course Teacher

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Course: FBT-501 “Fundamentals of Molecular Biology” (2+1) Lecture Plan (Practical)

S. No.	Practical	Practical Plan
1	Good Laboratory Practices – Biosafety and disposal of hazardous material.	01
2	Preparation of buffers and reagents.	01
3	Tissue sampling techniques for isolation of DNA and RNA.	01
4	Isolation of Genomic DNA by Phenol Chloroform Method.	02
5	Isolation of Genomic DNA by Salting-out method.	02
6	Isolation of Genomic DNA by CTAB method.	02
7	Preparation of Media for cultivation of <i>E. coli</i> .	02
8	Isolation of Plasmid DNA from <i>E. coli</i> by alkaline lysis method.	01
9	Isolation of RNA by TRIzol method.	01
10	Quality analysis of Nucleic acids by Agarose Gel Electrophoresis	01
11	Nucleic acid quantification by spectrophotometer/nanodrop.	01
12	Protein Purification. Separation of proteins by SDS- PAGE	02
13	Separation of proteins by Native PAGE.	01
14	Detection of mutation by Comet Assay.	01
	Total	18

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